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A target group-specific approach to "green" power retailing: students as consumers of renewable energy

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Abstract

An extensive body of literature exists on the obstacles that have to be overcome in green power retailing. In this article, target group-specific marketing is evaluated as a strategy to increase the share of residential customers of green power. A sample of students in the city of Freiburg, Germany was interviewed in order to assess their awareness of environmental issues, their willingness to change to green power products, and to better understand individual hindrances in changing the power supplier. The analysis shows that students are highly positive towards green power products, but for several reasons difficult to reach in marketing campaigns. Aspects to be considered in addressing this consumer-group include the students' particular expectations towards green products, their living-conditions, price sensitivity, and their perception of the relative effort involved in changing the power provider.

Keywords: Consumer demand; Energy markets; Marketing; Renewable energy; Sustainable Development; Willingness-to-pay

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1. Introduction

Green power[1] markets have grown substantially in recent years. Bird et al. [1] estimate that the number of residential green power customers has reached 2 million worldwide. However, such apparently high numbers conceal that the relative share of green power is still minor: residential market penetration is typically in the order of 1% [1]. If green power products are to make a significant contribution to the reduction of emissions of carbon dioxide (CO_2), their market share will have to grow considerably. Household electricity consumption in OECD countries currently accounts for about a quarter of total electricity consumption [2]. Strategies that can increase the share of green power markets thus need to be identified.

[1] Green power is, for the purpose of this article, defined as power derived from renewable energy sources such as sun, wind, hydro, biomass, and geothermal energy.

1.1. Energy use and emissions in Germany

Germany is a country with high per capita emissions of greenhouse gases (see Table 1). It has ratified the Kyoto Protocol [4] and is thus morally—though not legally—bound to cut down its emissions by 21% between 1990 and 2010.

In April 2002, the German government also decided on the abolition of nuclear power as a source of energy [5]. The maximum running period for nuclear power stations is now limited by German law to 32 years (based on a fixed rate of total power generation per station). In consequence, there is a given need to develop alternative energy sources, i.e. renewable energy. This need is further reinforced by the fact that 70% of all fossil fuels currently used by industrialized countries are produced in geopolitically unstable regions [6]. Given this situation, the German government has proclaimed the goal to double the market share of renewable energies from currently 2% to 4.2% (primary energy) and 6.2% to 12.5% (secondary energy) by 2010 [7].

1.2. Increasing the share of green power markets

While political goals are identified, it remains unclear of how to achieve these. For example, eco-taxes, one of the main governmental strategies to reduce energy use, have proven difficult to implement in Germany, meeting the resistance of large parts of the German population and industry lobby groups. Furthermore, they have so far failed to result in considerable reductions in energy use and associated emissions. Voluntary shifts of customers to green energy sources thus gain particular importance in the process of restructuring energy markets.

In this study, the potential of target group-specific marketing is investigated as a strategy to increase the share of green power markets. Target group-specific marketing could more rapidly open up new markets at comparably low costs, as funds for advertising are allocated to those consumer groups with the highest willingness to change the power provider. Regarding the choice of suitable target groups within society, students can be seen as better educated and thus as potentially more interested in green products (the role of the education has, for example, been pointed out by Wiser et al. [8] and Zarnikau [9]). In the following, the results of a survey among students in the city of Freiburg, Germany, are presented. A representative sample of students was interviewed to assess their awareness of

Table 1
Energy use and emissions, selected countries, 2000

Country	kW h per capita	CO_2-emissions per capita (t)
USA	13.843	20.57
Germany	6.684	10.14
Japan	8.333	9.10
China	993	2.40
India	393	0.92

Source: International Energy Agency, 2003 [3].

environmental issues, their willingness to change to green power products, and their understanding of the preconditions of such a change.

2. Method

The survey was carried out in June/July 2003 in Freiburg, Germany. A representative sample of students of the universities in Freiburg[2] was interviewed based on a judgement sample selection technique. In total, 450 interviews were conducted, representing 1.7% of the students enrolled in Freiburg at the time of the survey. Interviews were held in locations highly frequented by students, such as the cafes and restaurants of their respective campuses. A structured questionnaire was used to interview the students on various aspects of energy use and green power products, including socio-demographic data (age, sex, family status, subjects studied and available income), characteristics of the housing situation (private/shared, ownership), knowledge of and attitude towards green power products, willingness-to-pay (WTP), and information/marketing expectations. All questionnaires were filled in by the interviewers in direct communication with the students. As not all students were willing or able to answer all questions, the number of valid answers to each question is indicated in the following sections. Data were evaluated by using EXCEL, SPSS and comparative analysis.

3. Results

3.1. Socio-demographic data

With respect to demographics, 47.8% of the respondents are male and 52.2% female ($n = 450$). The sample is thus representative of the male/female student population in Freiburg (men: 48.7%, women: 51.3%). The age of the students interviewed is between 18 and 45, with about half of them falling in the age group 21–24. Regarding the family status ($n = 436$), 3.1% of the students are married, even though a larger percentage (14%) reported living in steady relationships, which often means sharing a flat. The reported monthly net income of the students ($n = 443$) varies between €100 and €2000, with an average of €642. As shown in Fig. 1, 12% of the students have a net income of up to €400 per month, while one-quarter (24%) has €401–500, another quarter (25%) €501–600, 15% has €601–700, and the remaining quarter (24%) more than €700.

3.2. Characteristics of the housing situation

Regarding the housing situation ($n = 450$), most students share flats ("collectives"; 45.1%). About one-third (32.2%) has rooms/flats of their own and 16.2% live in student homes (Fig. 2). About 6% of the students live with their parents, and the

[2] Albert-Ludwigs-Universität [10], Pädagogische Hochschule [11], Hochschule für Musik, Katholische Hochschule and Evangelische Hochschule.

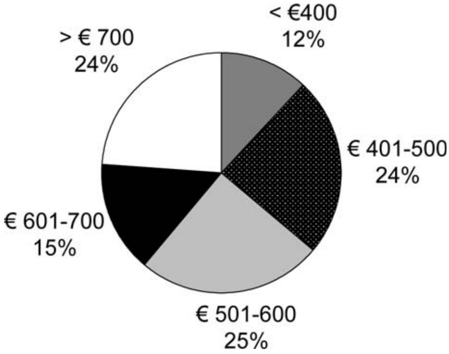


Fig. 1. Monthly net income of students, percentages.

remainder (0.4%) reported living in cars or mobile homes. Those students living in collectives share the flat on average with 2.9 other students. With respect to ownership ($n = 446$), 91.5% of the students pay a rent, as opposed to 8.5% of the students (or their parents) owning the room/flat.

3.3. Knowledge and attitude

As a proxy for energy awareness, students were asked to name the local power supplier ($n = 445$). About half (52.4%) of them were able to give the correct name, 10.8% named other power supplies, and 36.8% were unable to answer. In the following question, students were asked to define "green power" ($n = 399$). In order to categorize the answers as "right" or "wrong", green power was defined as "power from renewable energy sources such as sun, wind, hydropower and biomass" (other definitions exist, cf. [12]). Based on this definition, 92.3% of the students answered correctly, while 6.7% included other energy sources or stated that they were unable to define green power. The survey also revealed a highly

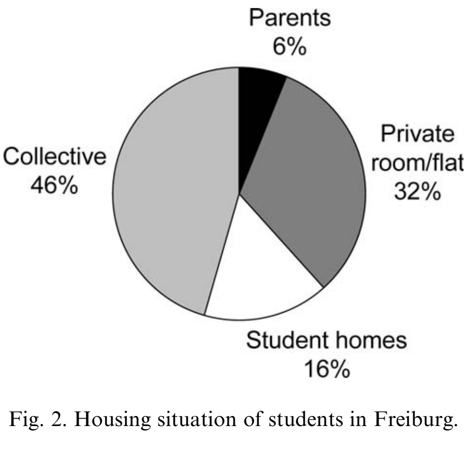


Fig. 2. Housing situation of students in Freiburg.

positive attitude towards green power: 99.7% of the students referred positively to the concept ($n = 450$). This positive perception is also mirrored in the high percentage of student consumers of green power products, which is 13.1% in this sample.

Students were also asked which preconditions needed to be met to make them change to green power products ($n = 361$). Roughly three-quarters (73.9%) reported that either prices for green power should decrease or that their own income should increase. Furthermore, 22.7% of the students were uncertain about the practical implications of changing the provider (perceived effort), and 15.5% expressed doubts concerning the reliability of green power providers. For instance, it was feared that some companies would just sell the green share of their power production at a higher price. Accordingly, 11.6% of the students demanded better information on the product before considering a change of the provider.

Regarding the students' WTP for green power products ($n = 407$), more than three-quarters (76.4%) reported positive values ranging between €0.02 and €30.00 per month, with a mean of €6.70 (median €5.00). Of those with positive WTP, 68.4% are willing to pay at least €2.00 per month, and more than half (54.6%) at least €5.00 per month (at estimated average costs of €15.00 per month). As shown in Fig. 3, there is a sharp decline in WTP beyond a value of €5.00, even though more than a quarter (27.1%) of the students still express a WTP of at least €7.50.

3.4. Information and marketing demands

The final section of the questionnaire addressed the students' information and marketing demands: how should green power suppliers advertise their products? There are two major aspects to this: (i) by what communicative means should

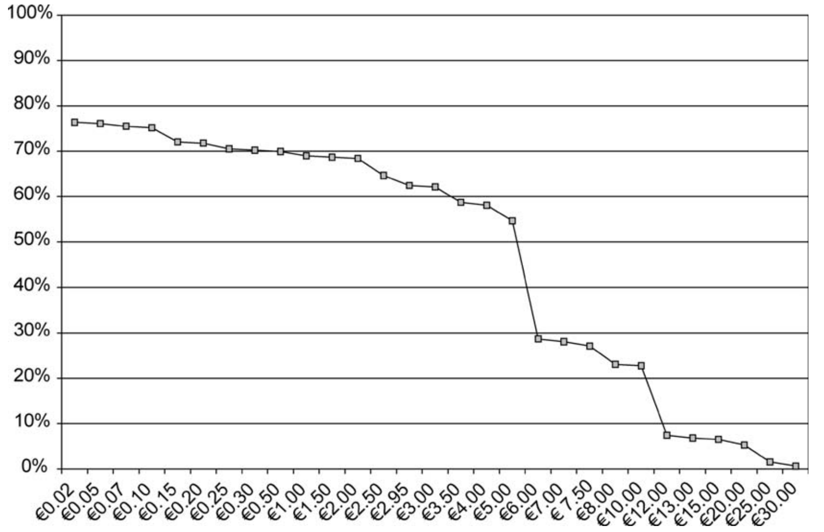


Fig. 3. Students' willingness-to-pay for green power products.

power providers get in touch with their potential customers, and (ii) what kind of information should they provide in order to convince the customer to choose their product? The analysis ($n = 316$, only first preference considered) reveals that student opinions are heterogeneous with respect to communication. About one-quarter (25.9%) prefers info-mail, followed by info-stands on campus or in student restaurants (21.2%). Advertisement in newspapers and journals is preferred by 11.7% of the students, followed by posters (5.7%), internet (5.4%), flyer distribution (5.1%), TV advertisement (4.7%), credit notes (4.7%), event sponsoring (4.4%), advertisement sent with power invoice (3.2%), e-mail (2.5%), info-letter when moving (2.2%), radio (1.6%), and others (1.5%). In contrast to these rather divergent attitudes towards marketing, student perceptions are more homogenous with respect to information. Information should be concise and address three main aspects (in order of importance):

(1) What are the additional costs for green power?
Here, the students ask for sample calculations that illustrate the additional costs of turning to green power products both in relative ("costs as much as a beer per month") and absolute terms ("a typical consumption of 50 kW h per month will result in additional costs of €x").
(2) How is green power produced?
Students demand information on both the definition of green power, and the respective energy sources of the supplier. In particular, students ask for "transparency", often in combination with claims of independent certification.
(3) How does the use of green power help in solving environmental problems?
The students want to know why it makes sense to change to green power products. From the students' point of view, this could be explained by pointing out the negative consequences of conventional power production. Even here, sample calculations are demanded; however, such calculations should rather take up a risk perspective ("how many nuclear power stations can be shut down if power is produced from renewable sources")?

Overall, it can be summarized that information demands are limited, but clearly focused on three aspects. Examples to illustrate costs and environmental gains are equally important. The presentation of these should be concise and easy to understand.

4. Discussion

The survey has shown that students are a target group with a highly positive attitude towards green power products. However, students also exhibit several other characteristics that are of importance in the context of marketing. First, despite the fact that many students are able to define green power correctly, knowledge on power generation, distribution and energy in general seems limited. For example, a number of students expressed fears that green power suppliers relying

on wind power stations would not be able to provide electricity during calms. Other students pointed out that changing to a green power supplier would not make sense, as the power received at home would always be coming from a mix of sources. Second, the provision of energy seems a highly irrelevant topic to students, and questions of supply/demand and environmental consequences are discussed only by few. This is confirmed by the fact that only half of the students were able to name the local power supplier. Third, energy and power markets are perceived as somewhat gloomy and suspect, an image that might result out of environmental catastrophes (havoc of oil tankers, Chernobyl), scandals (suppression of information on accidents in nuclear power stations) and dishonesty (selling of existing renewable power at higher prices by conventional power suppliers; cf. [12]). These events might have generated a general distrust in students towards power products, including green power. Note that this is true even for those students already being customers of green power products.

4.1. Energy prices and willingness-to-pay (WTP)

There is a complex paradox surrounding the perception of costs of green power products. With virtually no exception, students claimed green power products to be (too) expensive. However, this notion of expensiveness is not grounded in factual knowledge of energy prices as most students have no idea how much money they pay for electricity, or how much energy they use. Apart from the general disinterest in power issues mentioned above, the lack of knowledge could also be explained by the fact that students often pay monthly rents where the costs of water, garbage and power are already included. Similarly, students living at their parents' are not likely to pay for energy either. Consequently, the perception of expensiveness is arbitrary—a finding supported by the fact that the broad majority of students in Freiburg receive their power from a local (conventional) power supplier that charges comparably high prices. Switching to the most competitive green power supplier would, at a yearly consumption of 1000 kW h, not be more expensive. The situation is further complicated by the fact that most students claim that lower prices of green power products (or a higher personal income) are a precondition for changing the supplier, while more than two-thirds (68.4%) simultaneously declare to be willing to pay monthly premiums of at least €2.00 for green power products. Reported WTP should be treated with caution, though, as students are generally unaware of their energy costs and do not know how the values mentioned will add on their energy bills. Furthermore, round values of €5.00 and €10.00 are mentioned frequently, indicating rather arbitrary statements. On the other hand, values given in this survey do not differ substantially from those of other surveys, which found that 40–70% of residential customers are willing to pay 5–15% more for green power products (cf. [8,9,13,14]). Overall, it should be noted that there is a considerable paradox concerning the students' cost perception, WTP, and their knowledge of prices and energy.

4.2. Marketing from the student's point of view

In general, students appear undecided when asked about the best way of being contacted by green power suppliers. Generally, only two options are mentioned more frequently: info-mail (which should be non-glossy, as an eco-product is presented) and info-stands on campus. However, a large group of students also reject any kind of info-mail. Students in favour of info-mail were asked if such letters would truly catch their attention and, in their perception, could really lead to a change of the power supplier. Most students reported to read info-mail interestedly, as long as the information would be presented concisely. Info-stands on campus or in student's restaurants were also mentioned frequently as an option to catch the students' attraction. Such stands have the general advantage of addressing students more directly and to deliver information in a more personal way. Furthermore, the students can choose themselves whether they want to become involved in the marketing campaign or not.

The success rates of info-mail and information stands are difficult to predict. Even for convinced students, changing the power supplier might in the end prove to be too much of an effort. Obviously, this effort is perceived rather than real, as it does not take more than to fill in a one-page agreement. The argument is indirectly supported by the fact that those students reporting to already be customers of green power products had often become involved through action taken by others, for example an engaged student in the collective. Switching to green power products seems, at present, rather a result of word-of-mouth channels than successful marketing. Given the low interest of many students in green power products and the perceived efforts in changing the supplier, it is estimated that at least one-third of the students cannot be reached through any kind of marketing campaign. Similar percentages are also found in other surveys (cf. [15]).

Zarnikau [9] found that males and people with a higher income expressed a higher WTP. It was thus tested if this also applies to students. As Fig. 4 shows, female students express a slightly higher WTP in this study, thus contradicting Zarnikau's findings. Regarding income, the student-study seems to confirm Zarnikau's findings, even though the correlation is weak (Fig. 5).

4.3. Student expectations of green power products

With respect to student expectations, interviews point at the importance of credibility, both concerning production and environmental gains. The company should be a "true" green power provider, and not a conventional one labelling its share of power from renewable sources as a new, green product. Consequently, power should entirely be produced from renewable sources, and sources should be identified. The question of credibility becomes even more important given the fact that those students taking on the effort of changing to green power products are usually well-informed and can differentiate between products. They are thus likely to choose a power supplier fulfilling their expectations. Students also asked frequently

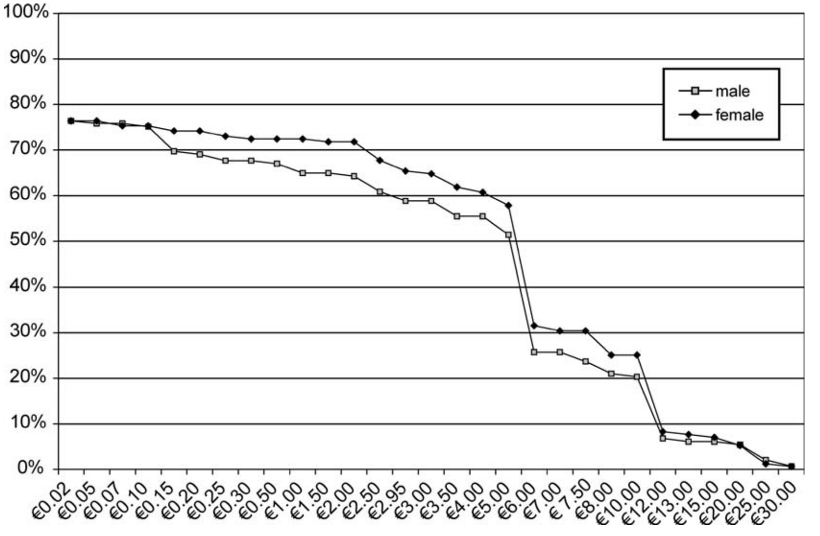


Fig. 4. Female vs. male's willingness-to-pay for green power products.

for certificates and transparency, which becomes even more relevant given the scepticism of many students towards green power products. Certification is thus relevant, also allowing for the easier identification of the product [8,16,17]. Green power labels are readily available in Germany (Grüner Strom Label).

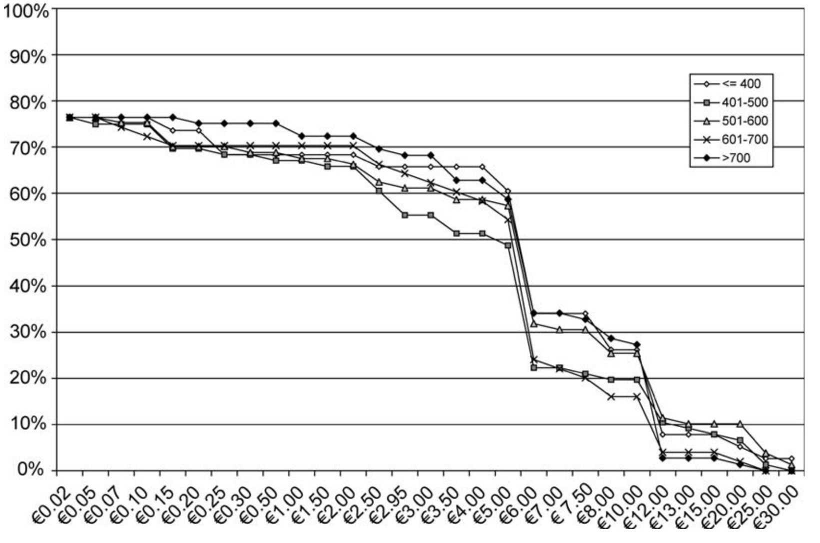


Fig. 5. Income classes and willingness-to-pay for green power products.

4.4. Structural hindrances to attracting students as a target group

As pointed out earlier, students judge green power products very positively. However, any provider of green power products identifying students as a target group should be aware of their living situation. Students usually live in a situation of constant change, as they often move (within a city or within cities), or interrupt their studies to study abroad or travel (a situation that is also reflected in the low level of flat/room ownership found in this study). Upon finishing their studies, students generally need to move in order to find a job. In such situations of change and uncertainty, students might often be reluctant to go through the extra effort of changing to a new energy provider. Furthermore, students usually have a wide range of duties, particularly those moving out from their parents' home for the first time. Such duties include tasks that were formerly handled by their parents, such as shopping (food), washing clothes, paying invoices and taking care of paper work (insurances, etc.). To manage one's studies is another time-consuming task. Simultaneously, studies are perceived as a period in life that is characterized by fun- and leisure-oriented activities. In consequence, the students' willingness to deal with additional tasks, such as changing the power provider, is greatly reduced. Marketing has thus to be pro-active, and the effort of changing the power provider needs to be reduced to the absolute minimum. Finally, students often live in collectives or student homes, where changing the power supplier has to be discussed with flatmates or the administration. Accordingly, many students reported that they had no influence on choosing the power supplier, and several reported that student initiatives to change the supplier had been stopped by the administration. Such structural difficulties demand additional action from the side of the power supplier. In the case of student homes, for example, policy changes may be necessary in order to make it possible for students to become customers of green power products.

5. Green power marketing for students

Marketing efforts of green power providers have usually been negligible. A survey in Switzerland found, for example, that 70% of the green companies evaluated had invested less than 1% of their turnover in marketing. Marketing of green power providers seems to largely rely on word-of-mouth channels, even though such passive strategies can be very successful. For example, the green power provider Elektrizitätswerke Schönau has never run a marketing campaign, but gained 20,000 customers since 1997 (taz. [18]). In contrast, conventional power suppliers such as the German E-on and Yello have run major campaigns with limited success [19]. Overall, only 5–10% of households in Germany have switched the provider since market liberalization (period 1998–2002; [2]). This raises the question of the importance of marketing and target group-specific marketing in particular.

Marketing green power products is generally problematic, as individual customers bear the additional costs for such products, while society as a whole profits from the resulting net public environmental benefits. From a purely economic

point of view, there is thus little incentive to switch to such products, as others will profit from the benefits of such action [20]. From an economic theory point of view, marketing green power products has to overcome problems inherent to the concept of *homo oeconomicus* (the rational human being guided by egoistic motives) and to convince customers to act altruistically. The necessary steps in this process are discussed in the following for German students.

As pointed out earlier, there are three major obstacles that have to be overcome in student-specific marketing: the perception of (i) high costs, (ii) low credibility and reliability and (iii) efforts in changing the supplier. With respect to prices, students seem anxious to be confronted with substantially higher power bills when turning to green power products. This is not necessarily true, because the current conventional supplier may often charge higher rates than the most competitive green power supplier. Furthermore, green power suppliers usually have low monthly fixed base rates (covering costs of electricity provision like networks), while demand rates (costs per kW h) are high. As new customers of green power tend to be more aware of their energy use, this often results in energy savings and lower costs. These findings are in contrast to the situation in Switzerland, where green power products are reported to be 90–700% more expensive than conventional power [21]. Marketing in Germany should thus seek to communicate that changing to a green power provider can actually be financially beneficial. In this context, it might be added that there are internet-based options to compare energy suppliers and their prices. For example, www.verivox.com offers the option to compare prices based on consumer-specific parameters including location and annual power consumption (in kW h).

Regarding credibility and reliability, it is important to communicate that the power comes from renewable sources, and that "investments" by the customers are used to develop new green power sources. Credibility can be enhanced through certification of the product [16], media representation and cooperation with environmental organizations or important mediators, such as schools. In this context, it should be noted that green products are only partly sold because of their environmental characteristics. Advertisement should thus also point out aspects of quality and health. In this sense, green power can also be marketed as a high quality, high-tech product that generates considerable benefits for high-tech, knowledge-based economies. Given the scepticism of some students concerning the reliability of green power, advertisement should also deal with this aspect. Finally, marketing should point out that the effort of changing to a green power supplier is minor.

Green power marketing campaigns need to remain as cost-efficient as possible—clearly, the competitive prices of many green power suppliers are a result of low marketing costs. This becomes even more important as the perception of higher costs for green power products might be maintained purposefully by conventional power suppliers. It is known that such utilities have sold their share of green power as a new, expensive product. This might ultimately have had the goal to suggest that only coal- and nuclear-based power can guarantee moderate prices (taz. [18]). As word-of-mouth communication channels are cost-free and have great importance for green power customers, campaigns might seek to explore these more

actively. Interpersonal contacts have a strong influence on consumer behaviour, and individuals with contacts to ecologically oriented people are thus more likely to change to green power suppliers. Marketing strategies building on such 'non-binding contracts' [22] are thus more likely to be successful, as they refer to socially controlled and shared social norms and values [23]. Given the importance of word-of-mouth channels, certified green power suppliers might try to involve their residential customers more actively in campaigns to convince friends or relatives in favour of their supplier. Such campaigns would entail virtually no costs, and could potentially be very successful.

It has been pointed out that marketing is about building and maintaining relationships with the customer [24]. This insight is even more important for green products characterized by high net public environmental benefits. Hammons et al. [25: p. 492] summarize: "successful green pricing programs have simple and tangible concepts, underline personal advantages for their participants, are communicated by professional marketing, and offered by utilities with creditable environmental record".

6. Concluding remarks

The study has shown that target group-specific marketing could be a means to systematically enlarge green power markets at comparably low costs. Students in particular can be seen as ideal-typical customers, as they are with virtually no exception in favour of green power products. Furthermore, once customers, they are likely to become life-long consumers of green energy and might also inform friends and relatives on the benefits of such products. However, marketing campaigns face major perceptive and structural barriers. For example, as long as students live in either student homes where the administration refuses to accept the students' wishes, or in rented flats where energy is paid with the monthly rent, any change to green power products is unlikely (for a comprehensive overview of technological and institutional challenges, see [25]). Regarding the perception of prices for green power products, the situation is somewhat paradox, as students claim that green power products are too expensive, while simultaneously expressing high WTP for such products.

More generally, the survey shows that the level of knowledge on energy issues is low, also revealing an educational problem in an industrialized nation that is highly dependent on energy. As Söderbaum [26] reminds us, human beings can only make democratic decisions when they are informed about the consequences of their actions. This becomes even more important as recent studies show that education is an important factor in energy-related decision making. For example, a higher level of education was shown to lead to higher WTP for green power products in the US [9], while in Switzerland, energy taxes were shown to be rejected particularly by the less educated, politically conservative and rurally living [27]. Furthermore, better information about energy resource options can increase the public's willingness to pay premiums for green energy [9]. Much depends thus on customer's knowledge and attitudes. From a policy point of view, energy suppliers

should be forced to indicate the mix of their energy sources in invoices and advertisement campaigns, also including environmental information. The European Union is now moving towards such standards [2], which will help customers to make knowledge-based decisions, moving away from the image that electricity is a "homogeneous product" [2: p. 493]. In this context, the options of introducing "energy" in the curricula of secondary schools might be investigated in order to make citizens of modern societies more aware of this important issue. Finally, it should be noted that the liberalization of the energy market in Europe is likely to lead to decreasing energy prices with the effect of growing energy use [2]. This is of importance, as in the absence of policies leading to higher energy prices favouring renewable energies, only private demand for green power can contribute to a change in the energy market composition.

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